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A REVISED LIST OF
BRAZILIAN SCLERACTINIAN CORALS AND
DESCRIPTION OF A NEW SPECIES

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INTRODUCTION

During the course of a three year sojourn at the Oceanographic Institute of the University of Recife a restudy of the reef corals of the Brazilian coast was undertaken. During this period of time the writer also participated in one of two cruises of the French research vessel CALYPSO in Brazilian waters. Collecting was done mainly by SCUBA diving and thus there was an opportunity to observe extensive populations of living corals and to note their vertical zonation and geographic distribution. These ecological data have been applied in reevaluating some of the species descriptions of the past. The present paper is a preliminary note giving a revised list of the corals observed, a description of one new species, and distributional data on hydrozoan corals. A more detailed account will be published following its submission as part of a doctoral thesis to the Faculty of Sciences of Marseille, France.

REVISED LIST OF BRAZILIAN CORALS

Order SCLERACTINIA

Suborder ASTROCOENIINA

Family POCILLOPORIDAE

Genus *Madracis* Milne Edwards and Haime 1849†* *Madracis decactis* (Lyman) 1859*Madracis mirabilis* (Duchassaing and Michelotti) 1861†* *Madracis pharensis* (Heller)

Suborder FUNGIINA

Superfamily AGARICIOIDEA

Family AGARICIIDAE

Genus *Agaricia* Lamarck 1801† *Agaricia agaricites* "var." *humilis* Verrill 1901†* *Agaricia fragilis* (Dana) 1846

Family SIDERASTREIDAE

Genus *Siderastrea* de Blainville 1830*Siderastrea stellata* Verrill 1868

Superfamily PORITOIDEA

Family PORITIDAE

Genus *Porites* Link 1807*Porites astreoides* Lamarck 1816= *Porites verrillii* Rehberg 1892 (= *Porites solida* Verrill 1868)*Porites branneri* R. Rathbun 1888

Suborder FAVIINA

Family FAVIIDAE

Subfamily FAVIINAE

† The species is discussed in the section, "Comments on the Taxonomy and Ecology of Brazilian Corals," beginning on p. 4.

* New record for Brazil.

Genus *Favia* Oken 1815

Favia gravida Verrill 1868

= *Favia* (= *Meandra*) *conferta* Verrill 1868

Favia leptophylla Verrill 1868

= *Heliastrea* (= *Orbicella*) *aperta* Verrill 1868

Subfamily MONTASTREINAE

Genus *Montastrea* de Blainville 1830

Montastrea cavernosa (Linnaeus) 1766

= *Orbicella braziliiana* Verrill 1901a

= *Orbicella cavernosa* var. *hirta* Verrill (1901a and 1901b)

= *Orbicella cavernosa* "var." *compacta* Vaughan (1901b)

Family RHIZANGIIDAE

Genus *Astrangia* Milne Edwards and Haime 1848

Astrangia braziliensis Vaughan 1906

Astrangia rathbuni Vaughan 1906

Genus *Phyllangia* Milne Edwards and Haime 1848

Phyllangia americana Milne Edwards and Haime 1848

Family MEANDRINIDAE

Genus *Meandrina* Lamarck 1801

Meandrina braziliensis (Milne Edwards and Haime) 1848

Family MUSSIDAE

Genus *Mussismilia* Ortmann 1890

† *Mussismilia braziliensis* (Verrill) 1868

† *Mussismilia hartii* (Verrill) 1868

† *Mussismilia hispida hispida* subsp. nov.

† *Mussismilia hispida tenuisepta* (Verrill) 1901

Genus *Scolymia* Haime 1852

Scolymia wellsii sp. nov.

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All the species listed were observed in the field and collected by the writer. The list cannot be considered definitive since more extensive collecting in the Brazilian region may bring to light other species, some perhaps new, especially in the genera *Montastrea* [one specimen from the Abrolhos reefs suggests the presence there of a species related to *M. annularis* (Ellis and Solander)] and *Mussismilia* [some deep forms in the sub-reef regions.]

The following species reported by previous authors appear to be synonymous with species in the list above:

Orbicella braziliana Verrill 1901a = *Montastrea cavernosa* (Linn.) — a deep water form.

Orbicella cavernosa var. *hirta* Verrill (1901a and 1901b) and *Orbicella cavernosa* "var." *compacta* Vaughan (1901b) are growth forms of *Montastrea cavernosa* found in well-lighted environments. It is not uncommon to find different portions of the surface of the same colony exhibiting the structure of the several "varieties."

Heliastrea (= *Orbicella*) *aperta* Verrill 1868 = *Favia leptophylla* Verrill — confirming the opinion of Matthai, 1928.

Favia (= *Meandra*) *conferta* Verrill 1868 = a form of *Favia gravida* Verrill — from agitated waters; confirms the opinion of Vaughan, 1901a.

Porites verrillii Rehberg 1892 (= *Porites solida* Verrill 1868) = *Porites astreoides* Lamarck 1816. Observation of type and field material showed that both "species" have very fluctuant features and overlapping ranges of variation. Systematics of *Porites* are still poorly known and a true regional and ecological study of the genus remains to be done. Since it is now completely impossible to draw a line between *P. astreoides* Lamarck and *P. verrillii* Rehberg, their provisional reunification seems justified.

The absence from the Brazilian fauna of many West Indian genera such as *Acropora*, *Oculina*, *Stephanocoenia*, *Diploria*, and *Dichocoenia* is once again confirmed.

COMMENTS ON THE TAXONOMY AND ECOLOGY OF SOME BRAZILIAN CORALS

The following species from the revised list are discussed here either because they are new occurrences for Brazil or because they have been subjected to some revisionary work by the author.

Madracis decactis (Lyman). Abrolhos reefs: common in well-illuminated environments on the outer reefs, 2-18 meters. Fernando de Noronha Islands: common in lower reef zone under rocky overhangs, 18 meters. Vicinity of Recife: on bottom of free calcareous algae, 35-75 meters. States of Rio de Janeiro and São Paulo (São Sebastião), common in rock crevices at depths of less than 4 meters.

Madracis pharensis (Heller). One colony of this Mediterranean coral was dredged by the CALYPSO at depths of 110-130 meters, 60 miles east of the Abrolhos reefs (S Lat 17° 16' 5" W Long 28° 30' 53".) The specimens agree closely with Mediterranean material examined. During a July, 1966, cruise of R. V. Jean Charcot this species was collected abundantly under overhangs at Deserta Island, Madeira Archipelago, at a depth of 20 meters.

Agaricia agaricites "var." *humilis* Verrill. The Brazilian variety is smaller and more delicate than the Caribbean population of this species. Bifacial fronds and crests are always small and little differentiated; a very delicate leaf-like form, but still quite different from the following species, *A. fragilis*, is sometimes found in very calm environments. Verrill (1901b) accorded this form varietal status; his nomenclature is retained pending a revision of the genus *Agaricia* currently being undertaken by Professor John W. Wells (personal communication).

Agaricia fragilis (Dana). This species, new for Brazil, is well separated from *A. agaricites* in that it is pedicellate and tends to be cup-shaped. The morphological and ecological characters of the two species are compared and summarized in Table I.

Mussismilia Ortmann. All the Brazilian corals described by Verrill as belonging to the genera *Mussa* and *Symphyllia* have been transferred by Vaughan and Wells (1963) to *Mussismilia*, a genus known also from the Miocene reefs of the Mediterranean region (Chevalier, 1961).

In 1868 Verrill described three species that are now transferred to *Mussismilia*. These are: *Acanthastraea braziliensis*, *Mussa harttii*, and *Symphyllia harttii*. Later (1901b) he maintained the first species, transferring it to *Mussa* (*Symphyllia*), and (1901a)

Table I. Comparison of Brazilian agariciids

	<i>Agaricia agaricites</i> "var." <i>humilis</i>	<i>Agaricia fragilis</i>
Form of corallum	Incrusting, nodular or foliaceous; never in pedicellate cups.	Pedicellate cup, laminar or thickened, attached by center.
Bifacial ridges and fronds	Sometimes present (small).	None.
Pattern of collines	Generally criss-crossing, with a tendency to circumscribe isolated calices.	Mostly concentric.
Diameter of calices	1.0 to 1.6 mm.	1.6 to 2.0 mm.
No. of septa per calice	Ca. 16.	Ca. 16.
Columella	Inconspicuous, deep or absent.	Always present.
No. (mean) of septocostae along the peripheral free edge of the corallum	Ca. 50 per cm.	Ca. 40 per cm.
Septal ornamentation on free edge of corallum	S ₁ : numerous blunt conical granulations. S ₂ : sometimes short longitudinal crests.	S ₁ : flattened, conical granulations, linked in short longitudinal crests. S ₂ : thin, denticulate, translucent longitudinal crests; some granules.
Relative height of septocostae on free edge	S ₁ higher than S ₂ .	S ₁ and S ₂ subequal.
Relative width of the same	S ₁ conspicuously wider than S ₂ .	S ₁ and S ₂ subequal.
Ecology	<i>Photophilous reef species</i> , tolerant of moderate turbidity and high temperatures. Sometimes in sciophilous position but never found deeper than 18 meters; in waters over 24°C.	<i>Sciophilous species</i> , best developed under overhangs on the outer Abrolhos reefs at 15-18 meters; commonly found by dredging in the <i>sub-reef zone</i> at 55-110 meters; in waters under 24°C.

synonymized *Symphyllia harttii* with *Mussa harttii*, having recognized an intergrading series between the original two species on the basis of additional material in the Peabody Museum collections at that time. He named four varieties of the emended species, *Mussa harttii*. His variety *conferta*, previously called *Symphyllia harttii*, represented to him one extreme in the series, with the corallites united to their summits; he regarded the variety *laxa* as the other extreme, with corallites in dichotomous groups and with the calices and branches free. Varieties *intermedia* with the corallites free for 1/3 to 1/2 their length and *confertifolia* with corallites free for only a short distance, Verrill considered as intermediate between the two extreme forms. In the same year Verrill (1901b) described *Mussa (Symphyllia) tenuisepta*, choosing as the type specimen a colony collected at Pernambuco in 1870 by Derby and Wilmot. (This specimen, YPM No. 4542, was originally labeled *Symphyllia harttii* in the Peabody Museum catalogue.) Moreover, he (1901a) gave the name *Mussa (Symphyllia) hispida* to a specimen (YPM No. 4287) that Dana (1846) had determined erroneously as *Astraea dipsacea* Lamarck. Matthai (1928) complicated the matter still further by uniting (without any clear written justification or explanation) Verrill's species, *Mussa braziliensis*, *M. tenuisepta*, and *M. hispida*, in his concept of *Protomussa braziliensis*. Field observations together with morphological studies of my extensive collections lead me to the following resolution of the problems just outlined:

(1) *Mussismilia harttii* (Verrill) should be restricted to the concept held of it by Verrill (1868) in his original description. The varieties *laxa* (YPM No. 1468, type, from the Abrolhos reefs), *intermedia* (YPM No. 4551, type, from Pernambuco) and *confertifolia* (YPM No. 4544, type, from Pernambuco) represent ecological variations of the species.

Mussismilia harttii is an important reef builder north of the mouth of the Rio São Francisco do Norte to Cabedelo. It is very abundant in the region of Bahia State and the Abrolhos reefs but has little significance in reef formation in this locality where it occurs along with *M. braziliensis*. Its southern limit is in the region of Vitoria. On the islands of Rocas and Fernando de Noronha it is very scarce, perhaps owing to the strong surf, and grows only in the more protected bays and coves.

(2) *Mussismilia hispida* (Verrill). This species is based on a specimen collected by the United States Exploring Expedition and identified by Dana (1846) as *Astraea dipsacea* Lamarek. The locality of collection is reported as the West Indies, but this is almost certainly an error. The specimen (YPM No. 4287) is very similar to my material from the region of Cabo Frio, Brazil, a locality visited by members of the expedition during their stopover at Rio de Janeiro in 1838. Since the populations of *M. hispida* show strong regional differentiation, it seems reasonable to suppose that Dana's specimen came from Brazil. Moreover, *Mussismilia hispida* has never again been collected in the West Indies.

Verrill's species *Symphyllia harttii* (1868), *Mussa* (*Symphyllia*) *tenuisepta* (1901b) and his *Mussa harttii* var. *conferta* (1901a) must all be regarded as synonyms of *Mussismilia hispida*. The great variability of the species warrants its subdivision into two geographical subspecies:

A. *Mussismilia hispida hispida* subsp. nov. This subspecies ranges from Salvador, State of Bahia, to São Sebastião, State of São Paulo. The following specimens of Verrill are included: *Symphyllia harttii*, YPM No. 1469, Abrolhos reefs; *Mussa harttii* var. *conferta*, YPM No. 4514, Periperí coast, State of Bahia; YPM 4287, type, ?Cabo Frio or vicinity.

B. *Mussismilia hispida tenuisepta* (Verrill). This subspecies is characterized by smaller septal teeth and thinner septa. It ranges from Rocas and Fernando de Noronha Islands south to the Baía de Todos os Santos where it intergrades with the other subspecies. The following specimens of Verrill are included: YPM Nos. 4542, type, and 4543, both from Pernambuco.

(3) *Mussismilia braziliensis* (Verrill). This species is well differentiated from *M. hispida*. Its nearly spherical colonies may attain a diameter of more than a meter and form the bulk of the coral growth in the Abrolhos region. The chief diagnostic characters are the extreme reduction of the trabecular columella, the small size of the calicles (ca. 8 mm) and the feebly developed exotheca which gives the corallum a subcerioid appearance. Little morphological variation was observed.

Its range is limited to the region between Salvador and the Abrolhos reefs. Verrill's types (YPM No. 1467, from the Abrolhos region) are in good condition.

Table II gives the geographical distribution of the various species of *Mussismilia* within the limits of the Brazilian coral reef region. Two important reefless regions that affect the distribution of corals are indicated. (See Table II and fig. 4.)

Table II. Distribution of *Mussismilia* in Brazil showing gradual enrichment from Cabo de São Roque to Abrolhos

	<i>M. harttii</i>	<i>M. braziliensis</i>	<i>M. hispida</i>	
			subsp. <i>hispida</i>	subsp. <i>tenuisepta</i>
Cabo de São Roque	dead only	O	O	O
Fernando de Noronha and Rocas	rare	O	O	common
Cabedelo to Maceió	abundant, important builder	O	O	common
Reefless region of Rio São Francisco do Norte				
Baía de Todos os Santos to Caravelas	common	common	common	rare
Abrolhos reefs	very abundant, but not a builder	very abundant; the main builder	very common	O
Reefless region caused by the Rio Doce group of rivers plus cold waters from the south				
Vitoria	dead only(?)	O	rather common	O
Cabo Frio to São Sebastião	O	O	rather common	O

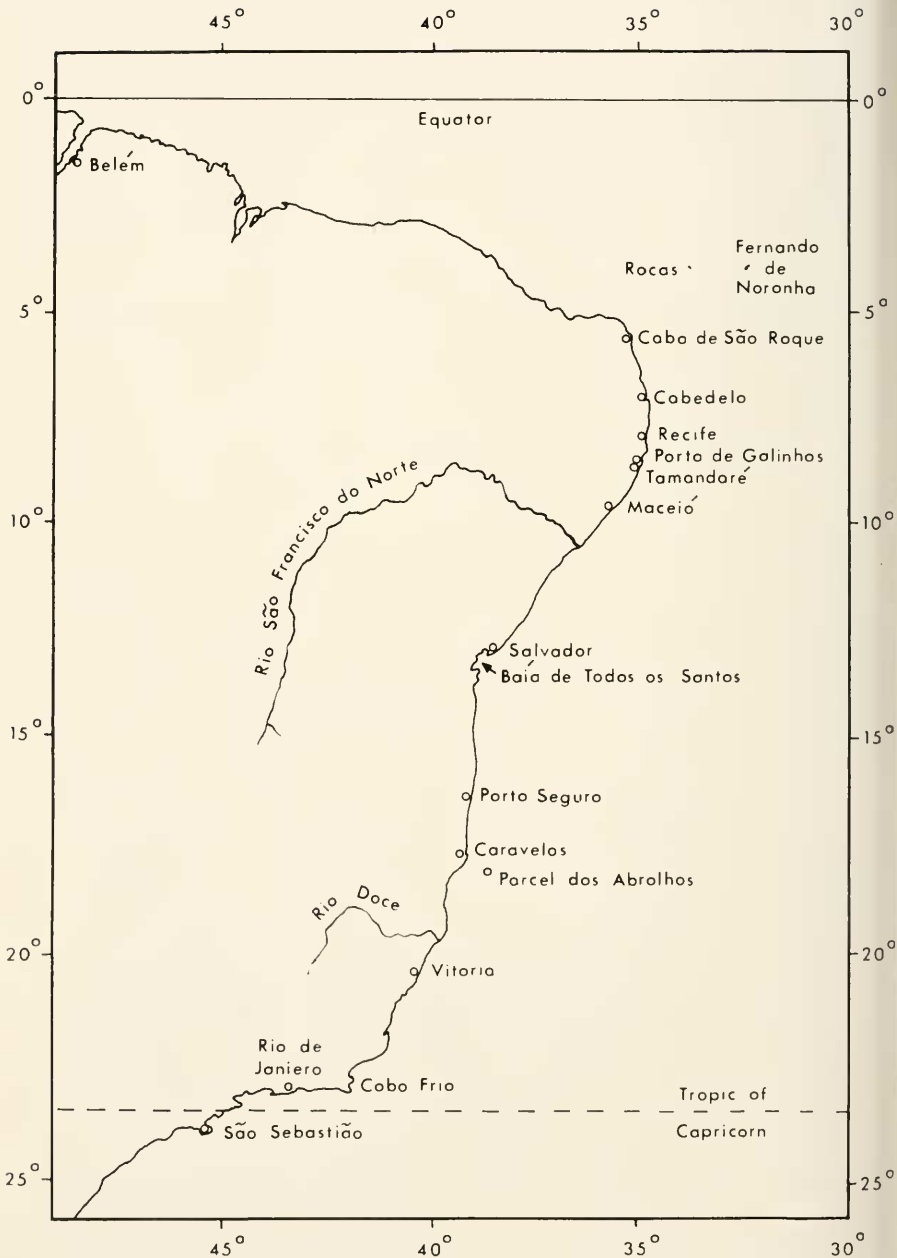


Figure 4. Map of the coast of Brazil showing localities mentioned in the text.

NEW SPECIES DESCRIPTION

Genus *Scolymia* Haime 1852

Mussids remaining simple during their entire life, without any division of the primary calice. This genus, the type species of which is the West Indian *Madrepora lacera* Pallas, was abandoned long ago on the belief that its various species were actually young stages of already known colonial mussids, chiefly *Mussa* Oken and *Isophyllia* Milne Edwards and Haime. It was retained by some paleontologists under the name *Lithophyllia* Milne Edwards and Haime. Wells (1964), who revived the genus, has pointed out that *Scolymia* has priority over *Lithophyllia*. This is a tropical Atlantic genus.

Scolymia wellsii sp. nov.

Figures 1, 2, 3

DESCRIPTION. Corallum simple, generally turbinate, sometimes cylindrical, flabelloid or discoidal, fixed to the substratum or rarely free.

Calicle rounded, elliptical or deformed owing to crowded conditions of growth. Maximum diameter 6 cm, concave, generally deep. Septa numerous; five complete cycles in a specimen of diameter of 5 cm. Sixth cycle incomplete. The first three cycles only attain the columella, the septa of higher orders joining these by bending. Primary septa thickened but much less so than in adult specimens of *S. lacera*. Septal teeth numerous (12 to 15), high, erect, brittle, lacinate, cylindrical; never wide and triangular as in *S. lacera*; teeth of septa of higher cycles bend toward the periphery and fuse to one another to give the septum a delicate lacelike aspect. Lateral faces of septa covered by rather numerous stout and blunt conical granulations.

Wall parathecate, sometimes becoming septothecate in old specimens. Costae strong with acute teeth ascending near the margin of the calicle. The fleshy parts of the polyp cover the whole corallum in very young corals only.

Color of the living animal: generally a bright green or lavender, sometimes chalky white or dark brown. In certain specimens from the Abrolhos a sectorial arrangement of the hues was observed: for example, one sector may be green and the rest of the polyp lavender.

ECOLOGY. *Scolymia wellsii* was found in three types of environment, all characterized by dimness of illumination: (1) On the vertical slopes of the "chapeiros" of the Abrolhos reefs, from 4 to 28 meters. (2) Under overhangs and in recesses of the back reef at Tamandaré (Pernambuco) and Porto de Galinhas (Pernambuco) at depths of only 1 to 3 meters. These reefs are generally washed by clear waters even in winter. (3) In the sub-reef zone, from 55 to 110 meters, on bottoms of calcareous algae on the continental shelf of northeastern Brazil (dredged by CALYPSO.) Some of these specimens were free and had developed into cornucopialike forms by successive regeneration.

HOLOTYPE. Corallum with diameter of 6 cm; from back reef of Tamandaré (Pernambuco); collected February, 1964, by J. Laborel; deposited at the Muséum National d'Histoire Naturelle, Paris.

PARATYPES. From same locality; deposited at the Peabody Museum of Natural History, Yale University; YPM Nos. 8117, 8118.

AFFINITIES. The species is very closely related to *S. lacera* (Pallas) from young specimens of which it is sometimes difficult to separate. Adults of *S. lacera* are larger (up to 12 cm in diameter) and less concave; the septa are thicker; and the septal teeth are triangular, a characteristic never observed in the Brazilian species. It is usually possible to determine even young specimens since the septal dentition of *S. wellsii* is less regular and more contorted than that of *S. lacera*.

DISTRIBUTION. From the latitude of Recife to that of the Abrolhos reefs.

NOTES ON *Millepora* and *Stylaster*

Three species of *Millepora* were encountered commonly:

(1) *Millepora alcicornis* Linnaeus. This species ranges from Cabo de São Roque to Cabo Frio and assumes a number of growth

Figure 1. *Scolymia wellsii* sp. nov., lateral view; from Tamandaré (Pernambuco). The larger specimen is the holotype with corallum diameter of 6 cm.

Figure 2. Calicinal view of the same.

Figure 3. Lateral view of a broken corallum of *Scolymia wellsii* sp. nov., showing arrangement of septal teeth.

